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Bush, Irving T.

Recommendations

[Newark, N.J.]

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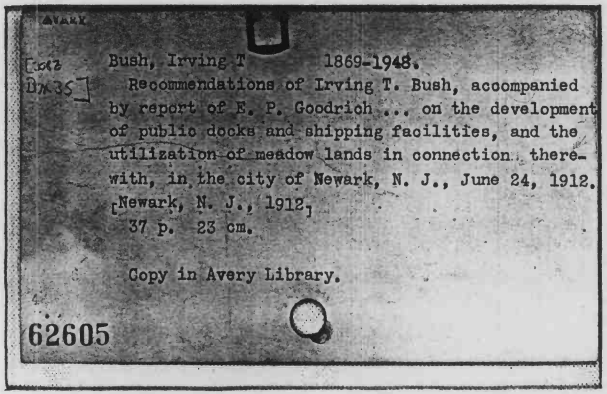
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RECOMMENDATIONS

OF

IRVING T. BUSH,

ACCOMPANIED BY REPORT OF

E. P. GOODRICH, Consulting Engineer,

On the development of Public Docks and Shipping Facilities, and the utilization of Meadow Lands in connection therewith, in the City of Newark, N. J.

JUNE 24, 1912

RECOMMENDATIONS

OF

IRVING T. BUSH,

ACCOMPANIED BY REPORT OF

E. P. GOODRICH, Consulting Engineer,

On the development of
Public Docks and Shipping Facilities, and
the utilization of Meadow Lands in
connection therewith, in the
City of Newark, N. J.

JUNE 24, 1912

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BUSH TERMINAL COMPANY

OFFICE OF THE PRESIDENT:
100 BROAD STREET

IRVING T. BUSH,
President

New York, June 24, 1912.

Morris R. Sherrerd, Esq.,
City Hall,
Newark, N. J.

My dear Sir:—

You will receive with this a report from Mr. E. P. Goodrich, upon the development of the waterfront of the Newark Meadows.

I have discussed this whole matter very fully with Mr. Goodrich, and have carefully gone over his report with him. The economic and business phases of the report I endorse, and am glad to say that they represent my views, as well as those of Mr. Goodrich. The engineering and statistical features I have no doubt are entirely correct, but I have not attempted to check them. You will recall that I told you that it was impossible for me to give the time to make a personal report upon this proposition, even though you paid me for it, as you were good enough to suggest. I told you, however, that without charge, and as a courtesy to you, I would be glad to give Mr. Goodrich my views, and discuss with him the various features of a report.

I believe absolutely that the success of Newark has been founded upon its industrial development, and it is my opinion, that instead of being a matter of regret that its water front is not used for ocean borne commerce, Newark should be congratulated upon the fact that the burden of maintaining facilities for this commerce is borne by its bigger neighbor, New York, and its water front and adjoining uplands have been left for industrial uses which give employment to a larger amount of labor, and pay greater tributes to the City and its citizens.

Mr. Goodrich has given a great deal of study to the Newark situation, and his opinion is entitled to great respect. In addition, his report represents my own views upon the business features of the situation.

I desire to assure you of my personal belief that the industrial development of Newark will be very great. Much will depend upon the character of the facilities which are created.

The suggestion which Mr. Goodrich makes in his report, for co-operation between the city and a private company, does not represent merely his own ideas on this subject, but definite lines of co-operation, which I told him I would be glad to discuss with the authorities of Newark, if the idea appealed to them.

Mr. Goodrich in his report has embodied my ideas, and I have embodied them in this letter to you although at the risk of repetition of a portion of the report.

I do not believe that it will be to the advantage of Newark to spend a large amount of money at the present time, in developing its water front to take care of deep-sea commerce. I believe that the lines should be established, and the development planned in a manner which will permit the City to provide facilities for this class of commerce at some time in the future, should it become desirable to do so.

My experience in our Brooklyn development teaches me that it is almost impossible to persuade the agents of freight steamers to discharge their vessels at any point in New York Harbor unless there is direct and reasonable access to Manhattan, for truck loads of merchandise which must go to that Borough. The reason for this is that almost every cargo which comes carries a large percentage of coarse freight which can be discharged anywhere, where lighter facilities exist, but there is also a small percentage of high-class freight which, while forming a small part of the cargo, pays a higher rate for carriage. This smaller percentage of freight is destined for use in Manhattan, and the agents of the vessel are unwilling to discharge the cargo at a

point which does not have the facilities for getting this part of the freight promptly to Manhattan. Therefore, in the final analysis, the location of the discharging and loading berth is determined by a small percentage of the cargo.

This same argument is true of outgoing vessels. There are, a few exceptions to this rule. They almost always consist of cargoes of coarse freight, which are destined to go in their entirety to some interior point of the country. If proper facilities were provided in Newark, to bring the railroad car into direct touch with the steamer, an occasional cargo of this kind could be secured, but it would be but a small return upon the city's investment, and would pay almost no tribute to Newark as it passed through. The merchandise would be loaded directly into cars, and would go through without benefiting Newark materially.

So long as there remains undeveloped a large amount of property in New York Bay, much nearer Manhattan in point of truckage and lighterage, it will be almost an impossible proposition to attract to Newark waterfront the class of deep-sea commerce which will really be of benefit to Newark.

It is also true that taken as a whole, ocean-borne commerce is of much less advantage to a city than is popularly thought. A large investment is necessary to create the facilities to accommodate this commerce, and a large percentage of the cargoes is distributed by rail directly to interior points.

The real foundation of Newark's present development, and, so far as I can foresee at the present time, the probable foundation for many years to come, is its industrial development as a manufacturing city. A manufacturing industry is of much greater advantage to Newark than a line of steamers. A manufacturing industry of any importance will give employment to several hundred people six days in the week. The number of people employed on the waterfront is out of proportion to the amount of space taken and the

money invested. The warehousing industry occupies a large amount of land, employs a small amount of labor, and the business is inactive. It is true that access to ocean-borne commerce is necessary for any great industrial centre and Newark is particularly fortunate, when its larger neighbor, New York, is supplying these facilities without cost to Newark.

The waterfront of the Newark Meadows should not be permitted, however, to lie idle. It should be developed in a manner to offer the very best facilities to take advantage of the nearness of Newark to the ocean-borne commerce of New York. Piers and bulkheads should be constructed, which would permit of the economical and expeditious loading and unloading of barges which will connect Newark with the ocean-borne facilities on New York Harbor. Nearly all of the merchandise which is landed on New York piers has to be transported by barge to some other place in the harbor before it is consumed. It costs but little more to move it on a barge to Newark, than it does to take it to South Brooklyn, or Harlem. If the facilities for unloading these barges are made as nearly perfect along the Newark meadow front as possible, together with facilities for getting merchandise to and from the industries which will develop back of the Newark Meadow water-front, the best development possible will be secured, and the greatest benefit accrue to Newark.

In my opinion, it is essential that the City plan to purchase some of the meadow property back of the water-front. The first interest of Newark is to create conditions which will permit of the successful industrial development of its meadow land. It is laid out along modern lines, with adequate facilities to connect with all of the railroads by side tracks, and with the best access to lighter berths on the waterfront, an industrial development of the first magnitude is sure to follow.

I have examined the tax maps of this territory, and I believe that the titles are so complicated that it is hopeless to expect a private company to acquire any large tract of this meadow property, and carry out a development enterprise. I believe that the City's power of condemnation must be employed to secure title to the property. I believe also that the burden of taxes and interest upon the initial purchase price of the property will break the back of any private company attempting to make the development.

As I have said before, the interest of Newark should be to create conditions which will assure a development of this property, and it is my belief that a co-operation of public credit and private enterprise might be arranged on the following basis:

Let the City condemn the property, and carry it as City property, for a period of years. This will relieve the enterprise of the yearly payment of taxes.

Let a development company agree to furnish the necessary capital to fill the property, pave and curb the streets, and lay the necessary water mains and railway tracks.

Let the City enter into a contract with this private company by which the company will become the selling agents of the property for the City.

When the property is sold, let the proceeds be divided between the City and the private company upon the pro rata basis of the investment of each, with a moderate commission added to the private company for its efforts. A plan of this kind will permit a reasonable partnership between private capital and the City. As soon as the property is filled, and a part of it is sold for an industrial site, it becomes a tax payer to the City, but the enterprise is encouraged during its development stages by the employment of civic credit. The City's share of the profit should more than pay the accrued taxes and interest.

I suggest this plan as a practicable method of accomplishing the desired result, without calling on the City to bond itself for a large amount.

The only other alternatives that I can see are either for the City to give up the enterprise altogether, or attempt to carry it through as a municipal enterprise, upon public credit. The latter course involves a very heavy financial risk to Newark and the City does not secure the co-operation of energetic private management. In any event, I believe that it is necessary to acquire with the waterfront property a substantial amount of the interior meadow lands, for, in my opinion, the development must be carried on in a broad gauged way, in order to be successful, and a frontage of waterfront development will be of little use unless some constructive method of sharing the development of the interior lands is made certain.

I have no doubt that this view will be a disappointment to some of the citizens of Newark. They must, however, take a common sense view of the matter.

Ocean-borne commerce is always a picturesque and attractive sight, but I advise the City of Newark to avoid a heavy expenditure in waterfront improvement, when they are so situated that they can take advantage of the improvements maintained by New York City.

When the capacity of New York Harbor itself has been outgrown, or when this point is in sight, it will be time enough to take up the question of attacting this class of commerce to Newark. This time is many years off, and even when it arrives, it will not be so profitable a use to Newark waterfront as to employ it in connection with an industrial development, which is the real foundation of the City's prosperity.

With best wishes for the success of the work which you have in hand, I am,

Yours very truly,

(Signed) IRVING T. BUSH.

REPORT

OF

E. P. GOODRICH, Consulting Engineer

TO

Board of Street and Water Commissioners,

NEWARK, N. J.

On the development of Public Docks and Shipping Facilities, and the utilization of Meadow Lands in connection therewith, in the City of Newark, N. J.

JUNE 24, 1912

The area of the present City of Newark comprises nearly 15,000 acres. Of that area over 4,000 acres are meadow lands. These lands are thus seen to constitute 27 per cent. of the total city area. This meadow tract is now practically idle, being used only for the raising of a small amount of salt hay, except those portions occupied for railroad tracks and yards and by a few industrial plants on the edge of the upland and along the Bay and River shores. These meadows have been an actual menace to health until within a few years, because of the mosquitoes with which they were infested. In this connection a quotation from a well written article by a man who has given a considerable study to the meadow problem is pertinent:

> "There is not a man in the State who would say that it would not be worth a million or more to the State to drain the meadows, if draining would do away with mosquitoes. There are no men in Newark or nearby brave enough to try to retard any plan for reclaiming, at any reasonable expense, all of the meadows, as soon as it is shown that the land thus reclaimed is needed and would be used."

Furthermore, the open state of the Peddie Street ditch and its use as an overflow outlet for a storm sewer makes all that waterway a considerable of a nuisance because with each storm the sides of the sewers are scoured by the floods and the scouring is carried out into the ditch, there to be deposited with the falling tide, and slowly putrify. The location of the pumping station in nearly the center of the meadow tract with the incompletely maintained outfall which allows the sewage to back into the Peddie Street ditch and other waterways with the rising tide is of a similarly detrimental nature.

The mosquito prevention measures which have been adopted have greatly alleviated the mosquito nuisance and the early construction of the trunk outfall sewer

will finally remove the sewage difficulty. There will remain, however, the unremunerative condition of the real estate, concerning which problem many suggestions have been made from time to time.

The history of Newark from the earliest dates, as disclosed by historical records on file with the Board of Trade and in the City Library, show Newark always to have been an essentially industrial community. The following table is illuminating:

NEWARK MANUFACTURERS.

1676 First Shoemaker.
1682 Much Cider.
1698 First Tannery.
1803 Large Shoe Manufacturers

Year	Plants	Employees	Total Population	Per cent. of Population Employed in Manufacturing
1830	80	3,179		
1835	163	5,587		
		(Panic 1837)		
1840			17,290	
1850			38,894	
1860	730	21,638	71,941	30
		(1862-1865 War)		
1870	1,131	22,126	105,542	21
		(1872 Financial Depression)		
1880	1,291	41,510	136,508	30
1890	2,490	46,848	181,830	26
1900	3,389	49,550	246,070	20
1906		50,697	290,000	17.5
1909	1858	59,955	347,469	17.3

	Wages	Per Employee	Value of Product	Per Capita
1835			$ 7,924,760	
1840			5,350,558	$310
1860	$ 6,117,952	$283	25,098,000	350
1870	11,537,270	522	48,133,303	456
1880	14,748,388	354	66,985,766	490
1890	26,857,170	573	93,476,652	515
1900	29,534,311	596	126,954,049	515
1906	25,621,626	506	150,055,227	520
1909			202,511,000	581

This table of the statistical history of Newark manufacturers shows very rapid, but consistent growth to have taken place. The percentage of increase of wage earners during the period 1899-1904 was 18.2 per cent., while the percentage between 1904-1909 was 18.3 per cent. The percentage of increase in the value of products in the period 1899-1904 was 33.1 per cent. while that percentage for the period 1904-1909 was 35 per cent. When the curves giving these several items are drawn so as to visualize the results, the history thus disclosed may be projected into the future and provide what is probably the best means of prophesying future conditions. From such a curve the following deductions may be drawn:

The number of plants has consistently increased until the last decade. A similar falling off during that period is to be noted in total wages and wages of employees. The number of employees, however, has increased, and the value of the output per capita. If the line representing the number of employees be projected into the future until 1950, an estimate of 100,000 industrial workers is obtained as of that date. With the present rate of growth of population the curve indicates approximately 1,000,000 people in 1950.

Study of the insurance maps and other atlasses which differentiate types of structures and make recognizable the factories in distinction from the tenements and dwellings, give further proof of the fact of Newark's industrial character. These same maps show the industrial establishments to be rather uniformly distributed throughout the city area, but with distinct tendencies toward the vicinities of railroads, the canal, the river front and the Bay shore.

The following table, copied from the Reports of the Superintendent of Buildings of the City of Newark, for the years 1907-11, inclusive, shows the number of storage buildings, factories and alterations in each Ward of the City for each of the years mentioned. The predominance of the work done in the 10th and 12th, which are eminently meadow Wards is to be noted.

STORAGE BUILDINGS.

Wards:	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	Total
1907	4	5	5	3	4	4	7	5	7	20	4	9	5	12	2	5	101
1908	4	7	2	4	5	3	3	9	5	13	3	12	2	4	0	4	80
1909	3	6	6	5	8	4	2	8	10	14	4	27	5	3	0	3	108
1910	4	5	6	5	3	1	3	9	6	20	5	15	2	4	3	8	99
1911	3	4	3	8	7	2	3	8	8	18	5	24	6	7	2	7	125

FACTORIES AND ALTERATIONS.

Wards:	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	Total
1907	2	2	1	5	13	3	0	5	8	14	6	20	5	8	0	1	93
1908	3	6	1	12	6	1	6	7	7	14	2	19	2	2	0	5	93
1909	1	14	3	8	8	3	8	6	14	41	9	30	3	6	3	6	163
1910	8	8	5	15	14	2	10	12	17	36	12	20	5	5	1	5	175
1911	4	5	3	12	15	2	7	6	13	34	7	24	3	4	0	4	143

TOTAL EXPENDITURES FACTORY BUILDINGS.

1907:	
1908:	$ 405,855 00
1909:	795,050 00
1910:	1,030,467 00
1911:	901,198 00

Some property still exists which is available for the erection of factories upon the uplands, but studies of maps of different dates clearly indicate the industrial trend toward the meadows

The increase of filled area secured between the dates of 1868—that of the earliest available—and 1907, the latest authentic map at hand ,shows that only a small portion of the total meadow area has been reclaimed during the past forty years. At the same rate, or even with the acceleration which is likely to take place because of the increased rate of growth of cities which is now being followed, at least a century would be consumed in reclaiming the full meadow tract under natural conditions.

Examination of the tax maps shows that the meadow properties are exceedingly irregular in shape and apparently located without reference to highways, waterways or other natural features. The valuations are also found to be low, except closely adjacent to the water front and to the high land, and at the present moment, high also in the vicinity of properties which have been recommended for acquisition by the City by one of the several Commissions which have lately reported on the meadow proposition. A comparison between the real estate values of meadow and uplands shows that Newark's valuation could be increased in considerable measure were the meadow lands to be consistently developed. The following notes as to specific valuations are of interest:

Valuation of 2,643 acres of uplands in the taxing district comprising the fifth, tenth and twelfth Wards, outside of the meadows are:

Land	$10,631,265 00
Improvements ...	15,065,700 00
	$25,696,975 00

This land value is equivalent to, approximately $4,000 per acre. The old meadows in the same District comprise 3,340 acres, for which the total valuation for land and improvements amounted to $473,965.00, or but $142 per acre. The Clinton meadows comprising 380 acres are valued at $18,475 or less than $50 an acre, while the uplands adjacent to the Clinton meadow tract totalling 250 acres are valued:

Land	$2,056,855 00
Improvements	891,200 00

This land value is equivalent to $8,200 per acre. No taxes were paid on the meadow lands previous to about 1893. The Clinton meadows were not assessed until 1897. It is understood that the Elizabeth meadows are not now assessed.

It is thus seen that $2,500 an acre would be a very reasonable valuation for improved meadow property. With that figure per acre the increase in Newark real estate values would amount to a total approximating $10,000,000 were such an improvement to take place as has been suggested.

Heretofore such meadow land development has been by private individuals or railroad corporations solely by a process of fill. About 1895 a competition was inaugurated by the Board of Trade of the City of Newark under which were submitted numerous solutions of the problem of reclaiming the meadows. Shortly subsequent to that competition, in 1896-1897, a project of diking and draining, similar to what is done so successfully in Holland, was put forward by Mr. C. C. Vermeule, in The Annual Report of the State Geologist for those years (Mr. John C. Smock). The Advisory Dock and Meadow Reclamation Commission appointed under authorization of the Board of Street and Water Commissioners, by resolution dated February 6, 1908, made a special study of the advantages and disadvantages of the two types of reclamation above mentioned, viz., diking and fill. It was their unanimous opinion that the method of fill by one or another means was far superior to that involving diking, drainage and pumping. That Commission gave further study to two different methods of making the fill, viz.: by material brought on to the meadows from outside points and by using material dredged from the meadow area to raise the grade of the adjoining meadow lands. Such dredged areas might take any convenient shape, but it was the recommendation of the Advisory Commission that the work be so restricted as to provide a canal available for commerce or to produce additional water frontage suitable for industrial use. They say:

> "Two general schemes of development are possible: first, diking and drainage; second, reclamation by filling. The first method is now being carried out in some parts of the State by drainage for agricultural purposes and for mosquito prevention. As far as the other points are involved it is certain that far better results will be secured by the City as a whole by the second method.

Under the usual system of progressive municipal government, the improvement of the meadows would be by opening and grading streets and filling the lots to be in accord with the streets. Then would follow curbing, flagging, sewers and water mains to render property available for use.

To accomplish this, the cost would probably be as follows: Assuming that the cross streets are 66 feet in width, the avenues 100 feet and the size of the blocks 800 by 200 feet, this would give practically 12 lots to the acre.

Cost of improvement of a lot 25 by 100 feet may be estimated as follows:

Filling street..	364 cu. yds.		
Filling lot	650 cu. yds.		
	1,014 cu. yds. at 50c.		$507.00
Curbing		$ 9.90	
Flagging		19.20	
Sewers		46.25	
Paving		213.00	
			288.35
Cost of improving each lot			$795.35
Cost per acre, including streets.			$9,544.00
Improving 1,150 acres, as suggested hereafter.....			$10,975,600.00
Improving 950 acres (reclaimed portion, exclusive of canal)..			$9,066,800.00

The cost of improving each lot exclusive of filling is seen to be $288.35, or a cost per acre, outside of filling, of $3,460.00. The filling by ordinary methods at 50c. per cubic yard would be $6,084 per acre. Assuming the total area to be reclaimed as 1,150 acres with a proposed canal 700 feet wide giving a water surface of 200 acres, there is left 950 acres to be filled, and the cost of filling this land by dredging

at 16c. per cubic yard would make the cost of improvement of a lot 25 by 100 feet, as follows:

Filling 1,014 cu. yds. at 16c..	$162.24
Improvements as above....	288.35
Total cost per lot.....	$450.59
Cost per acre.....	$5.407.08
For the improvement of 950 acres	$5,136,726.00
Cost of improving 950 acres by first table.....	$9,066,800.00
Difference, showing saving in reclaiming by canal construction	$3,950,074.00

These figures would indicate that if the land were purchased and merely a canal dug, and the excavated material used for filling the lots, there would be a saving of nearly four millions of dollars in the reclamation of about 1,000 acres. Allowing for the loss of the land taken for the canal, and not taking into consideration any use of the canal for industrial and shipping developments, it is therefore, manifest that the most economical treatment of the meadows is by excavating such a canal."

This argument is fully justified by facts secured with regard to many other known localities.

Any consistent effort to reclaim the meadows must almost of necessity be municipal in character. The irregularity of the parcels and the avariciousness of owners would make it practically impossible for any private corporation without the rights of eminent domain to acquire the lands at reasonable costs. Again, were a private corporation to undertake such development and actually secure control, while the interest on the investment might be within reasonable bounds, still an antagonistic City administration might come into office which would make use of the power of increasing taxes so as to cripple or bankrupt such an undertaking. Again, it is the tendency throughout the United States, and indeed throughout the world, that water frontage

be actually owned by the commonwealth. Were, therefore, any large increase of water frontage to be made within the limits of Newark, the municipality should obtain and retain control thereof. Were such control to be acquired only after development at the hands of private interests, the city would eventually have to pay much more than if title to prospective water front lands is now secured and carried at the expense of the community. In either case, the city has better credit and can borrow money at a cheaper rate than can any private corporation, so that the ultimate cost to the community would be less were the city to acquire the lands now and hold them until they can be developed along carefully studied, comprehensive lines, than to allow the lands to pass into private hands with the necessary accompaniment of heavy interest rates and carrying charges, eventually to be acquired by the municipality at a considerably augmented figure.

The right of excess condemnation has been denied by the courts in many states, but there is in this instance, a possibility for Newark to secure the advantages of a precisely similar line of action by the exercise of privileges which are undoubtedly entirely constitutional so far as they apply to her water frontage and lands incidental to the development thereof . To be sure, the city will lose the annual taxes which might be exacted from a private corporation; but with the present land values, the aggregate of such taxes will certainly be small and the city would be securing to itself the advantages of the appreciation in value which will be almost inevitable during the next few years.

A decision as to the amount of such water front development which Newark should undertake must rest upon careful analyses of various conditions. Such frontage may be used for high-class maritime commerce with ocean-going vessels and also an intermediate class of trans-shipment business carried on by barges, lighters, canal boats and similar smaller craft towed to Newark's docks from the regular landing points of the large

ocean-going craft, or, the frontage may be made to provide berthing space for such smaller craft, and for coastwise and such ocean-going vessels as are used to convey merchandise to and from industrial plants located in close proximity to the water front at which the vessels are berthed. In any well rounded development, each of these classes of wharfage is essential, but in the case of Newark it would seem obvious that the industrial class should largely predominate.

As has been said, Newark is essentially a manufacturing community. She stands among the highest in the per capita value of her manufactures, as is to be seen from the following data taken from the Report of the Department of Commerce and Labor, under date of 1910:

Locality.	Value of Manufactures Per Capita.	Per cent. of Population Being Wage Earners in Manufactures.
U. S.	$150	7.3
Pittsburg	633	12.6
Minneapolis	546	8.9
Chicago	522	13.4
NEWARK	515	17.3
Providence	503	20.7
Paterson	496	25.5
Cincinnati	484	16.6
Philadelphia	467	16.2
New York	400	11.6
San Francisco	389	6.8
Boston	368	10.1

A simple trans-shipment by water of the imports and exports which go through the factories of Newark would be of material moment, whether such commerce were carried by ocean going vessels or by lighters and similar craft to Newark's docks from the greater extent of New York Harbor. In any logical scheme of development, the first water-borne freight to arrive is comprised within the designation "building materials." After the factories have been built, the homes and

stores erected and the industries started, follow the "crude materials entering into manufactures." The "completed manufactured articles" make up some portion of the return cargo. At first this commerce is served by small craft transporting the merchandise from the waterfront of the growing community to the berthing space of the large ocean-going vessels which cannot afford to dock at a small industrial establishment or community, because of lack of return cargo. Finally, when a port becomes so far developed that vessels can afford to stop at it, the first ones so doing will be the tramp vessels coming in with random cargoes or taking out small single lots or mixed ladings. Finally, with increase of business, regular liners will be made to touch at the docks of such a community and if growth continues, the final outcome will be the establishment of a regular steamship line to it. With Newark, however, situated as she is in close proximity to the greatest of world ports, New York Harbor, the condition will always exist that the great liners, both freight and passenger, will demand docking space in close proximity to the point of densest population where are to be found the greatest demand and consumption. It has been the experience of many terminal companies that it was almost impossible to persuade the agents of freight steamers to discharge their vessels at points which did not provide direct and reasonably inexpensive access to Manhattan Island simply for the portion of the cargo which must go to that Borough. In almost every cargo which arrives within the confines of New York Harbor, while the major portion may be consigned merely to a broker and therefore placed immediately in storage or be consigned directly to points outside the confines of the water frontage of Manhattan Island, to which ample lighterage facilities exist with their corresponding small cost; there almost invariably exists a small percentage of high-class freight specifically consigned to merchants in Manhattan. Such commodities pay higher rates for carriage. They are often of a perishable nature des-

tined for immediate consumption in Manhattan and the vessel owners and agents are correspondingly anxious to secure quick discharge and immediate delivery. They therefore are unwilling to discharge any part of the cargo at a point which does not have facilities for getting this preferential part promptly to its destination on Manhattan. In this instance, a small percentage of the cargo dictates the location of the discharge and often of the re-loading of the vessel. Where cargoes consist of coarse freight routed to some interior point the vessel will prefer to dock where a railroad siding exists so that direct transfer can be made between vessel and car. Newark could provide such facilities because of the large numbers of roads which can be reached by any development taking place on her meadow lands; but such cargoes are of rare exception, as is proved by the actual use to which the railroads which now predominate upon the Jersey water front actually put their berthing space.

As has been said, such a transfer would take place where railroad car and vessel can come into close touch; where the labor cost of transfer of cargo is a minimum. Newark would be able to collect but small tribute from such a transaction, and any expenditure for such transshipment facilities could be carried only by the community at large, because the benefits could be felt only indirectly. Somewhat the same criticism will hold with regard to a large part of any ocean-borne commerce. Keen competition now exists between the various ports on the Atlantic seaboard and even between the various parts of New York Harbor for such commerce, and while the economic necessity exists of bringing much freight to New York, (so that the natural competition within that port develops high rentals for berthing space) it is a well known fact that in most competing ports, free wharfage is usually given any vessel which will come to them to unload and load. Newark is in a somewhat similar position with regard to New York Harbor, so that wharfage fees which she

might collect either on municipally owned water frontage or through taxes and indirect charges on privately owned piers might be measurable, they would still be far short of those which have so greatly advertised Manhattan Island, and, any charges which Newark could exact would return to the community at large but meagre compensation for moneys expended. There still remain other properties in New York Harbor much nearer Manhattan in point of truckage and lighterage than is Newark, and for many years to come it will probably be impossible to attract to any Newark water frontage a class of commerce which will be of direct benefit to that municipality except through the line of imports of raw materials destined for manufacture within her bounds and exports of the articles so prepared. If Newark develop any water frontage as a municipal enterprise, some portion should manifestly be so designed as to provide accommodations for general commerce ocean-borne; but it is believed that it would be illogical for Newark to spend any great sums to attract deep sea commerce. At such time as such commerce would naturally flow thither, Newark would still have sufficient opportunity to develop additional docks within the limits of its present proposed acquisition of meadow lands.

The Advisory Dock and Meadow Reclamation Commission, to which reference has already been made, analyzed Newark's necessities for water frontage along these very lines and determined that by 1950 hardly more than five miles total of lineal feet of water frontage would be required on a conservative basis of estimate, to care for the whole of the ocean-borne commerce which it might be fairly assumed would be attracted to the City of Newark. This estimate was reached after a careful consideration of the values of Newark's merchandise per capita per annum, and of the proportions of such manufactures which are exported and imported, and of the crude articles entering into them similarly treated. Values per ton of exports and imports were

assumed, as well as the density of commerce per lineal foot of water front per annum which was to be expected. That Commission was thus driven to the conclusion that Newark could more profitably develop her water frontage for industrial use than for strictly maritime commerce. Their argument is as follows:

"The shipping of a port may be classified as follows:

(a) Vessels carrying foreign imports and exports.
(b) Coastwise traffic.
(c) River and canal traffic.
(d) Inter-harbor traffic, such as ferries, etc.

The present available wharfage of the port of New York is about one million lineal feet. Of this total only about 10 per cent. is given to ocean-going vessels. The Department of Docks and Ferries of New York City and private owners have created about 15,000 lineal feet of additional wharfage per year for the past ten years. Most of this increase is to accommodate ocean vessels, and is apparently providing for the present rate of increase of this class of tonnage.

The possibilities of a continued increase of wharfage on Upper New York Bay at a rate sufficient to care for the probable increase in ocean tonnage were investigated. Aside from possible alterations and the resulting additions in the wharfage room on the Hudson River, only certain tracts of the Brooklyn and Staten Island shores are available without very great expense. The latter aggregate about 50,000 lineal feet of water front and could be made to provide 250,000 feet of wharfage. This, together with what will be made available on the Hudson River, will probably provide wharfage room to care for all requirements for the next fifteen years.

* * * * * * *

One method of arriving at the probable requirements for a port of foreign shipping is through a study of the imports of some existing ports, and their relation to the growth of

the manufactures of the vicinity. It has been found that the increase of foreign tonnage follows very closely the growth of the value of manufactures in the United States and applies to many of the coast cities. The probable future value of manufactures can, therefore, be taken in arriving at the probable needs for foreign shipping facilities at any date in the future.

Newark stands high among the cities of the United States in her per capita value of manufactured products, and compares favorably in its growth in this respect with New York City, and New York may be taken as a basis for comparison. Applying a value which obtains in New York City of $550.00 per capita for the value of the manufactured products to an estimated population of the City of Newark of 1,500,000 in 1950, we will then have a value for manufactured products of $780,000,000.00. The cost of crude material used in manufacturing in New York City is about 53 per cent. of the total value of manufactured products, and assuming this ratio and applying it to the conditions of Newark in the year 1950, would give a value of $414,000,000.00 for crude materials used in its factories.

At the present time for the United States as a whole, the value of crude materials is only about 10 per cent. of the total value of crude materials employed in manufacturing. Few ports are extensive manufacturing cities, and for the City of Newark, which now stands high in the per capita value of its manufactures and certainly high in its proportion of crude materials needed, the amount of crude materials that would be directly imported is likely to exceed the above 10 per cent. and therefore this percentage may be safely used in arriving at the probable extent and value of crude materials imported. This gives a value of imported crude materials on the total estimated value of manufactured products of $41,400,000.00, and from the statistics of other ports it may be stated that crude materials form slightly more than one-

half of the total importation. Therefore, it is safe to assume that the total value of imports for the City of Newark in 1950 will be $80,000,000. The percentage value of the exports of manufactured articles to the total value in the United States is only about 7 per cent. This would give for Newark in 1950 7 per cent of our estimated total value of manufactures, which is $780,000,000, as stated above, or an equivalent of $54,600,000 for the value of the exports of its own manufactured articles. In the whole United States the ratio of the manufactured and partly manufactured exports to the total exports is approximately 58 per cent; and if we consider the $54,600,000 arrived at above as representing 58 per cent. of the entire exports we would have as a value for the total exports from Newark in 1950 the sum of $94,000,000, and adding to this the estimated value arrived at above of $80,000,000 for imports of crude material we would have a total value of exports and imports for the Port of Newark for the year 1950 of $174,000,000.

Now, the value of imports and exports per gross vessel ton, varies widely in different ports according to the proportion of passenger vessels entering the port, which carry comparatively little freight, and according to the proportion which high-class freight bears to the whole value carried. A study of these values has led to the adoption in this estimate of a value of $60.00 per ton of exports, which is only slightly less than that for the United States as a whole, and is exactly that of the Port of New York, and the adoption of a value of $40.00 per ton of imports, which is practically that of the United States as a whole but somewhat less than that of New York. These values per ton will give probable total tonnages for Newark in 1950 of 2,000,000 tons of imports and 1,570,000 of exports, or a total of 3,570,000 tons, while the tonnage of its own manufactures is see nto be 910,000 tons exports and 1,025,000 tons of imports, or a total of 1,935,000 tons.

> In order to ascertain the amount of water frontage necessary to care for the prospective tonnage, an investigation was made of what may be called the density of tonnage per annum per lineal foot of wharfage room. A fair uniformity was found and a density of 160 was considered conservative for the proposed docks of the City of Newark. This assumption makes necessary a total water frontage of piers and bulkheads of approximately 24,000 lineal feet to accommodate the total estimated foreign tonnage for the Port of Newark for the year 1950."

The above mentioned Board recommended to cover the requirements as they foresaw them:

> * * * * a reclamation of 40,000,000 square feet of land exclusive of water surface. The riparian rights should be acquired for the full 4,000 feet frontage on the Bay.
> * * * * * In addition to the canal itself piers and slips are suggested for the Bay frontage north of the canal and two piers and three slips on the north side of the canal to the west of those fronting on the Bay * * *. This layout it is thought will cover all the probable ocean and coastwise trade that can be induced to come to Newark in a reasonable period.

A manufacturing industry is of much greater advantage to Newark than would be a line of foreign steamers. An industrial enterprise, if of any importance, will give employment to hundreds of people six days in the week while the number of employees required for the handling of commerce is certainly small and largely out of proportio nt othe amount of space taken and the money invested. A warehouse industry occupies large land areas but employs small quantities of labor and the business is often negative. The very proximity of Newark to New York, with its gigantic commerce touching all points throughout the world makes greatly for Newark's pre-eminence as an industrial centre. She can therefore secure greater efficiency and a higher return

by catering to manufacturing than to water commerce.

The query immediately arises as to what requirements must be met i nthe way of providing available land for use as industrial sites with Newark's growth during the next forty years.

By projecting into the future the number of employees which have been engaged in industrial pursuits, some idea may be gained as to the probable requirements in the way of land necessary for Newark's growing industrial development. The first Advisory Dock and Meadow Reclamation Commission discussed this item also to some extent, as follows:

> "The census figures of the manufactures of the city as to values of buildings and real estate serve as a basis for a rough estimate of the possible requirements for industrial sites brought about by the development of the city * * *. Investigation shows that the assessed valuations of the several sections of the city most thickly filled with manufacturing plants average both in the aggregate and on numerous individual sites about $1.00 per square foot of land occupied. The present valuation of land occupied by manufacturing establishments is $8,974,000, or at the above rate 8,974,000 square feet. It may be contended that the reclaimed land value will never reach this figure and that each factory will occupy larger tracts which can be obtained at less cost than is now possible, thus affording greater inducements for manufacturing plants locating in this section, and the area required may, therefore, be estimated at more than double the area which would be given by the use of the above figure of $1.00 per square foot.
>
> It may be assumed that twice the proportionate increased area will be needed. With a present population of 300,000 in the City of Newark the manufacturing area is approximately 9,000,000 square feet. With a population of 1,500,000 in 1950, the area required would be 45,000,000 square feet and with the probable increased area of land which may be acquired for the reasons above set forth the total area occupied might amount to 90,000,000 square feet, this being about one-half the full area of the meadows."

A careful investigation has been made by various authorities with regard to the average area occupied per person in industrial establishments of various kinds. A careful census was made of nearly 100 plants in and around Newark and an analysis made of about fifty of them about which sufficient information was obtainable. These nearby fifty plants employed approximately 10,000 employees and occupied almost 1,000 acres of land. The average land occupied per employee was a trifle over 4,000 square feet. The plants ranged in size from 400 square feet to nearly 20,000 per employee, and the number of the latter in an establishment ranged from 4 to nearly 4,000. Such a range was covered so as to include as many varieties of work as possible and as many typical industries. Obviously, no such concentration has been employed in making up the figures as is to be found in any one of the industrial buildings of the Bush Terminal enterprise, where only 80 feet is the average amount of land occupied per employee. If it ever be possible that a terminal company be given a lease or franerise for operation of the water front railroad sidings and industrial buildings on the meadows, not so much land may be necessary of reclamation as is to be expected from the investigation of existing conditions and their interpretation with regard to future necessities. With an increase of 40,000 employees between 1910 and 1950 and an assumed area of 2,000 square feet per employee (only one-half of the average above deduced for present conditions) areas for industrial purposes are indicated aggregating 80,000,000 square feet or nearly 2,000 acres. This is equivalent to about one-half of the meadow tract and closely approximates the figure derived by the first Advisory Dock and Meadow Reclamation Commission.

Objection has been raised to the location of industrial buildings on the meadow property, because of the extra

cost involved in installing piles in the foundations so as to produce a suitable structure. Records of a number of buildings, among which are included such light structures as one-story blacksmith shops, storerooms, etc., and such structures as the Bush Terminal factory buildings show that that portion of the total building cost involved in the purchase and driving of piles ranges from 2½ per cent. to 5 per cent. Experience at the Bush factories shows, however, that this extra cost would be saved many times over were arrangements to be carried out on the meadows whereby a merchant could deliver his goods to a Terminal operating company and thus save heavy trucking costs and other incidental charges.

One of the criticisms against a canal, as suggested in one form or another so many times of late, has been the possibility that it may become foul from sewage contamination and naturally stagnant water. Such a condition might result were all the sewage in the vicinity to be dumped into the waterway without an effort being made to secure circulation or make use of natural means of securing fresh water. With a properly designed and constructed sewer system in the City of Newark there would be very small opportunity for sewage to enter the canal except that very small portion which will be derived from those persons who are actively engaged on its waters and along its shores. If the canal is so dredged as only to provide a proper waterway for those industries which locate along its banks, and material for fill is secured by increased depth, the natural circulation from rise and fall of tides and stirring up of the water by tow boats and other shipping will prevent natural stagnation. Investigation of the subject shows further that it is possible to turn the waters of Bound Creek into the head of the canal and even though there is a relatively small quantity of water flowing through this creek under average and dry weather conditions, still the 1,500,000 gallons of fresh water per day will contribute a considerable source of cleansing power. Furthermore, by the construction of a relatively large basin at the head of the

canal into which the tide will rise and from which it will fall twice daily there will be carried through the canal proper a considerable current, quite sufficient to prevent nuisance from the small amount of sewage which may naturally enter it through the natural oxydizing power of the harbor waters. The fresh water entering from Bound Creek will possess a still greater oxydizing power, and if it be assumed that a dilution of 10 to 1 is all that is necessary considering the fresh water from this source together with the water from the Bay brought in by tide, and if the sewage may be considered as amounting to 100 gallons per capita per day, it will be seen that the 1,500,000 gallons would be sufficient to care (without the possibility of a nuisance) for 1,500 people. This is considered many more than will contribute to a contamination of the waters of the canal and its head basin, it being understood that all industrial plants along the shores will be properly sewered into the regular sewer system of the City.

The best obtainable information in regard to Bound Creek is derived from gagings made from August, 1898, to May, 1899, during which period the maximum flow was 8,000,000 gallons per day and the average daily flow about 2,750,000. The average for September, 1898, was estimated at a little over 1,300,000 gallons, this being the lowest monthly record observed. The rainfall for that month was rather under the normal. It is thus evident that during any month when the rainfall is at all excessive there will be such a stirring up and dilution of the canal waters by those derived from Bound Creek as to produce a practically complete flushing and consequent prevention of any possibility of nuisance. The actual nuisance from such well known waterways as Newton Creek and Gowannus Canal in New York City will be far from being realized in Newark under the circumstances.

Those waterways, however, serve as a guide for another item of criticism which has been raised against the canal, namely, that it is likely to freeze during the

Winter. Information received from towing companies and industries operating on those waterways reveals the fact that Newtown Creek has never been frozen for the last twenty years so but that tow boats could break up the ice without great difficulty. Gowannus Canal empties into the head of Gowannus Bay, which is so located that winds blow ice across New York Bay and pack the floes into the mouth of the canal. In spite of this condition the canal is frozen over only about a week at a time two or three times each season. Such a condition in the canal at Newark would hardly be ground for much criticism. The whole matter depends upon the amount of tow boat and other shipping traffic through the canal itself during the winter season.

Twenty years ago ice formed a much larger obstacle than at present because the increased size and draught of all vessels enable them to break through ice much more effectively than formerly. Natural freezing has never been an obstacle to such water traffic in either of the waterways mentioned, pack ice being the only embarrassing factor.

When the Newark meadow canal is compared with the Erie and other New York canals it is seen that it will be in commission many more months in the year than are those waterways which are absolutely out of business four or more months each year, purely because of ice conditions. Still, those canals are considered highly profitable to the State at large through the benefit derived from reduction in freight rates to all industries and shippers located along their banks.

A canvas of the inquiries made by prospective industrial settlers in Newark during several months showed that a considerable proportion of them desired locations close to water frontage, at least one-tenth so expressing themselves directly.

The records of tonnage water-borne on the Passaic River and Newark Bay do not show much increase during the last ten years, but as has been pointed out, the industrial development of the meadow tract and the

proposed canal will be of much greater intrinsic value to Newark than would be derived from catering heavily to maritime commerce. In this connection the following extract from the Report of the Chief of Engineers of the United States Army for 1911, is instructive:

> "The commerce of this River (Passaic) is mainly in building material, iron ore, fertilizers, coal and general merchandise."

A list of annual total tonnages and values follows:

1900	2,037,363
1901	2,009,356
1902	2,494,312
1903	2,356,511
1904	2,567,942
1905	2,567,000
1906	2,577,188
1907	2,577,188
1908	2,110,959
1909	2,650,809
1910	2,226,291

In the same report a tabulated list of freight traffic for the year 1910 is given as follows:

NEWARK BAY AND PASSAIC RIVER FREIGHT TRAFFIC YEAR 1910.

	Amount (Customary Unit)		Amount (Short Tons)	Valuation
Ale and Beer			14,850	1,292,000
Brick	269,862	M	390,804	1,047,769
Candles and Tallow	9,500,000	bbls.	4,750	660,000
Cement, Plaster, etc.	86,102	long tons	96,435	1,154,387
Chemicals and Colors	46,309	" "	51,906	4,855,393
Coal	139,605	" "	171,004	535,779
Fertilizer	52,237	" "	58,506	806,390
Fish and Shellfish	68,640	baskets	1,716	61,776
Machinery and manufactures	22	long tons	25	14,400
Grain	611,054	bushels	16,804	608,425
Ice	30,000	long tons	33,600	67,200
Oils	28,540,257	gals.	101,103	880,476
Ores and Metals	100,258	long tons	112,289	26,103,333
Paving Blocks	3,083	" "	3,454	40,403
Sand and Stone	384,596	" "	430,745	827,259
	11,500,000	lath		
Lumber	127,689	ft. b.m.	244,464	2,547,814
General Merchandise	390,785,000	lbs.	195,392	18,400,135
Miscellaneous:			24,188	780,406
To and from Hackensack River	280,583	long tons	314,256	1,623,242
			2,266,291	62,216,587

PASSAIC RIVER ABOVE NAIRN LINOLEUM WORKS.

Brick	83,000	M	17,080	70,062
Coal	53,983	long tons	60,460	249,000
Chemicals and Colors	6,641	" "	7,477	383,385
Lumber	52,356	M ft. b.m.	84,446	330,141
Oils	3,000	bbls.	1,500	45,000
Ores and Metals	150	long tons	168	2,325
Stone and Sand	75,414	" "	84,464	145,020
Miscellaneous	818	" "	916	8,300
			256,511	1,233,233

These figures cover too short a period to demonstrate anything with regard to the future. In the same sense the small rate of increase of docking space on Newark Bay and the Passaic River should not be used as a criterion for judging of future increase or of its value to the community.

Reports of these same engineers and of the Department of Agriculture, Bureau of Drainage Investigation, describe the soil of the meadow tract as—

> "* * * * a vegetable muck, ranging in depth from two to fifteen feet deep, with an average depth of about nine feet. The top of the soil for a depth of three or four feet is a tough fibrous mass of plant roots and stems, which is underlaid with a semi-liquid stratum of fine material, mostly of vegetable origin with a small amount of silt and clay mixed with it. The entire mass is strongly impregnated with salt. The muck is underlaid with a bed of compact clay with some sand and gravel mixed with it."

Information obtained as to the amount of silting and slipping of banks encountered during the progress of the present dredging project in Newark Bay discloses the fact that somewhat less than one-tenth of one per cent only has had to be removed after a proper depth had been obtained. This covers a period of nearly five years and is an indication in case that no danger is to be expected from silting or slipping and that practically no cost would be involved in maintaining channels in the Bay or through the meadows.

All investigations thus point to the desirability that the Newark meadows should not be permitted to lie idle.

They should be developed in such a manner as to afford the very best facilities and so that advantage can be taken of the nearness in location of Newark to the great ocean-borne commerce in New York. Piers and bulkheads should be constructed and so equipped as to permit of the economical and expeditious loading and unloading of barges which will act as the carriers between Newark and the facilities in New York Harbor. Such water carriage is by far the cheapest mode of transportation and since a very large percentage of all the merchandise which is landed on New York piers to be transported to some other place in the Harbor before it is consumed, Newark will be able to draw a large proportion if she has the proper terminal facilities. It costs very little more to move freight on a barge to Newark than it does to take it to South Brooklyn or Harlem. When facilities for unloading such barges are made as nearly perfect along the Newark meadow front as is possible, together with the installation of the most highly developed facilities for getting merchandise to and from the industries which will develop back of her water front, the most economic development possible will be secured and the greatest benefit will accrue to Newark. It is essential to the most complete solution of this problem that the city plan to purchase some of the meadow property back of the water front in addition to the Bay frontage itself. If all this property is laid out along modern lines with adequate facilities to connect with all of the railroads by side tracks and with the best possible access to lighter barges on the water front, an industrial development of the first magnitude is certain to result; provided, however, in addition to property acquisition and industrial development there is secured a proper coordination of the whole transaction as finally developed and kept in operation. It would seem that a co-operation between public credit and private enterprise might be arranged which would conduce to this end more advantageously than with any other arrangement. For example, let the city condemn the property, and carry

it as city investment, for a period of years. This will relieve the enterprise of the yearly payment of taxes.

Let a development company agree to furnish the necessary capital to fill the property, pave and curb the streets, and lay the necessary water mains and railway tracks.

Let the city enter into a contract with this private company, by which the company will become the selling agents of the property for the city.

When the property is sold, let the proceeds be divided between the city and the private company, upon the pro rata basis of the investment of each, with a moderate commission added to the private company for its efforts. A plan of this kind will permit a reasonable partnership between private capital and the City. As soon as the property is filled, and a part of it is sold for an industrial site, it becomes a taxpayer to the city, but the enterprise is encouraged during its development stages by the employment of civic credit. The city's share of the profit should more than pay the accrued taxes and interest.

Success in the operation of such enterprises in Europe has been more marked than has been the case in this country, probably due mainly to just such a scheme of co-operation between the municipality and individuals as is above suggested. The co-operation which manages the Liverpool and Birkenhead Docks is very similar in its scheme of operations and is one of the most successful organizations in the world. By the scheme here outlined, the city is not called upon to bond itself for a large amount and it secures at the same time that initiative which can come from investment of private capital with much greater efficiency than is obtainable in any municipal enterprise. If undertaken purely upon public credit, Newark will obligate herself to a heavy financial risk and she loses the co-operation of energetic private management, which has been found necessary abroad in the success of every enterprise. Unless some constructive method of sharing the cost of the development

of the interior lands is made certain, the whole enterprise is apt to struggle along for many years without results commensurate with the magnitude of the enterprise. Ocean-borne commerce is always a picturesque and attractive sight but the City of Newark can well afford to forego such pleasures and thus avoid heavy expenditure in water front improvements, taking advantage at the same time of those things which will inevitably continue New York City as the greatest of world ports. When the capacity of New York Harbor has been outgrown will be amply soon to take up the question of attracting to Newark's water frontage ocean-going craft and a large maritime commerce. This time is many years in the distance, and even when it arrives it will not contribute to Newark's prosperity in anything like the measure obtainable through the highest industrial growth. The latter is the real foundation of any city's prosperity.

These views are put forward irrespective of any personal affiliations with what may be considered competing enterprises on the part of those who have examined this subject. They are absolutely unbiased and while they may be disappointing to some of Newark's citizens, these gentlemen should endeavor to reach a large and broad gauge common-sense view of the whole undertaking.

Respectfully submitted,

(Signed) E. P. GOODRICH,
Consulting Engineer.

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TITLE